Upper Ocean Hydrography and Currents in the Japan Sea

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LONG-TERM GOAL

The long-term goal of this project is to better understand the properties of the upper portion of the water column in the Japan Sea. It is important to understand the seasonal cycle in the upper 800-1000 m of the Japan Sea: how the Sea stratifies in spring and summer and how it forms a mixed layer in fall and winter, sometimes with deep convection occurring, and the location and strength of the major features of the mid-depth circulation.

OBJECTIVES

I want to be able to study the circulation and hydrography of the upper 800-1000 m of the Japan Sea over at least a few complete seasonal cycles in order to understand the process of mixed-layer formation and destruction there. In some ways the Japan Sea behaves as a subtropical ocean, and in other ways it is more like a subarctic one; as a result, it is a useful laboratory for studying many oceanographic processes that occur throughout the world ocean. I have deployed 36 PALACE floats in the Japan Sea in this study, and the work discussed here fits into a larger program in the Japan Sea with about 20 PIs.

APPROACH

I have deployed 36 PALACE floats in the western Japan Sea during the summer of 1999. These floats were deployed from the Russian research vessel *Professor Khromov* , from the FERHRI laboratory in Vladivostok. These floats will cycle between the sea surface and 800 m depth at approximately 7 day intervals and collect profiles of temperature and salinity during their ascent phase on each cycle. In all, about 1500 profiles per year will be collected this way. This will provide good coverage of the Japan Sea, even in the winter season. All of the results are being made available in real-time via the ARGOS system and a web page. I am presently doing similar work in the N. Atlantic, and the results from both oceans can be viewed on the web at http://flux.ocean.washington.edu. Figures showing the location of the floats, and an example of a temperature/salinty profile, are included at the end of this document.

WORK COMPLETED

The PALACE floats for this work were purchased from Webb Research, Inc. We carried out the final assembly at UW, as well as calibration, ballasting, and preparation for shipping. 6 of the 36 floats were purchased using funds from this grant, with funds for the remaining 30 coming from a related DURIP grant. Most of the deployments were inside the Russian EEZ in the Japan Sea. In order to carry out

this work, clearance was requested from the Russian government approximately 2 years in advance of the deployments, and there was some doubt that it would be granted until just before the cruise departed. Most of the instruments were deployed by Russian scientists; no US personnel were allowed to participate in the cruise inside the Russian EEZ. Several Russians visited Seattle in early 1999 in order to be instructed in the use of these instruments. In addition to the float deployments, a major CTD/chemistry operation was conducted during the cruise.

RESULTS

The field work for this project began in August of 1999, so there are no concrete results from this project at this time. However, the data from the floats can be viewed in near real-time at the web site given above. This site is updated daily.

IMPACT/APPLICATION

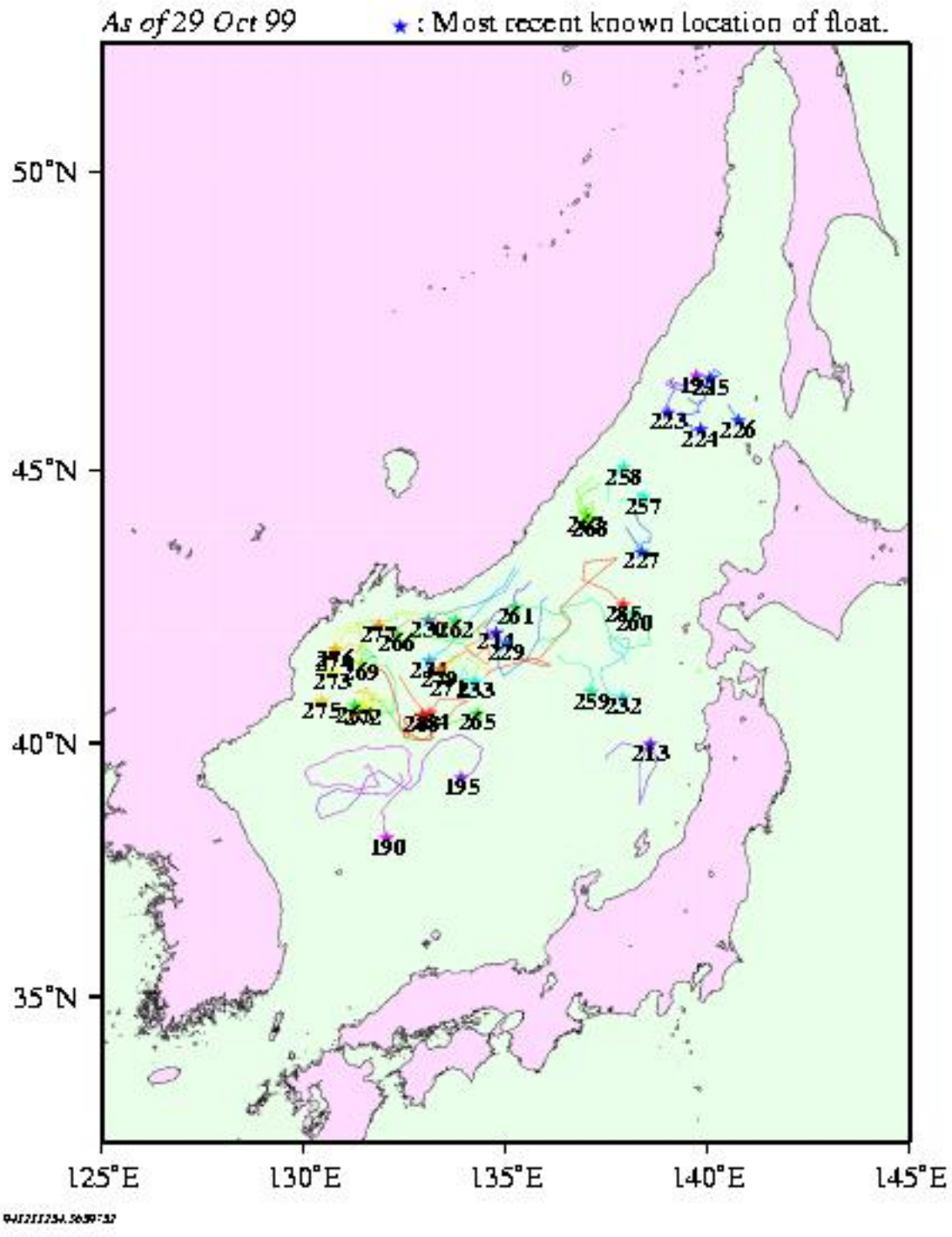
There are none yet, but I think that once people see the impact of real-time views of the upper ocean in the Japan Sea, in all seasons, the application for modeling and other logistical needs will become obvious. In the N. Atlantic, our work has already had applications in models of climate change and in assessing the results of hurricanes.

TRANSITIONS

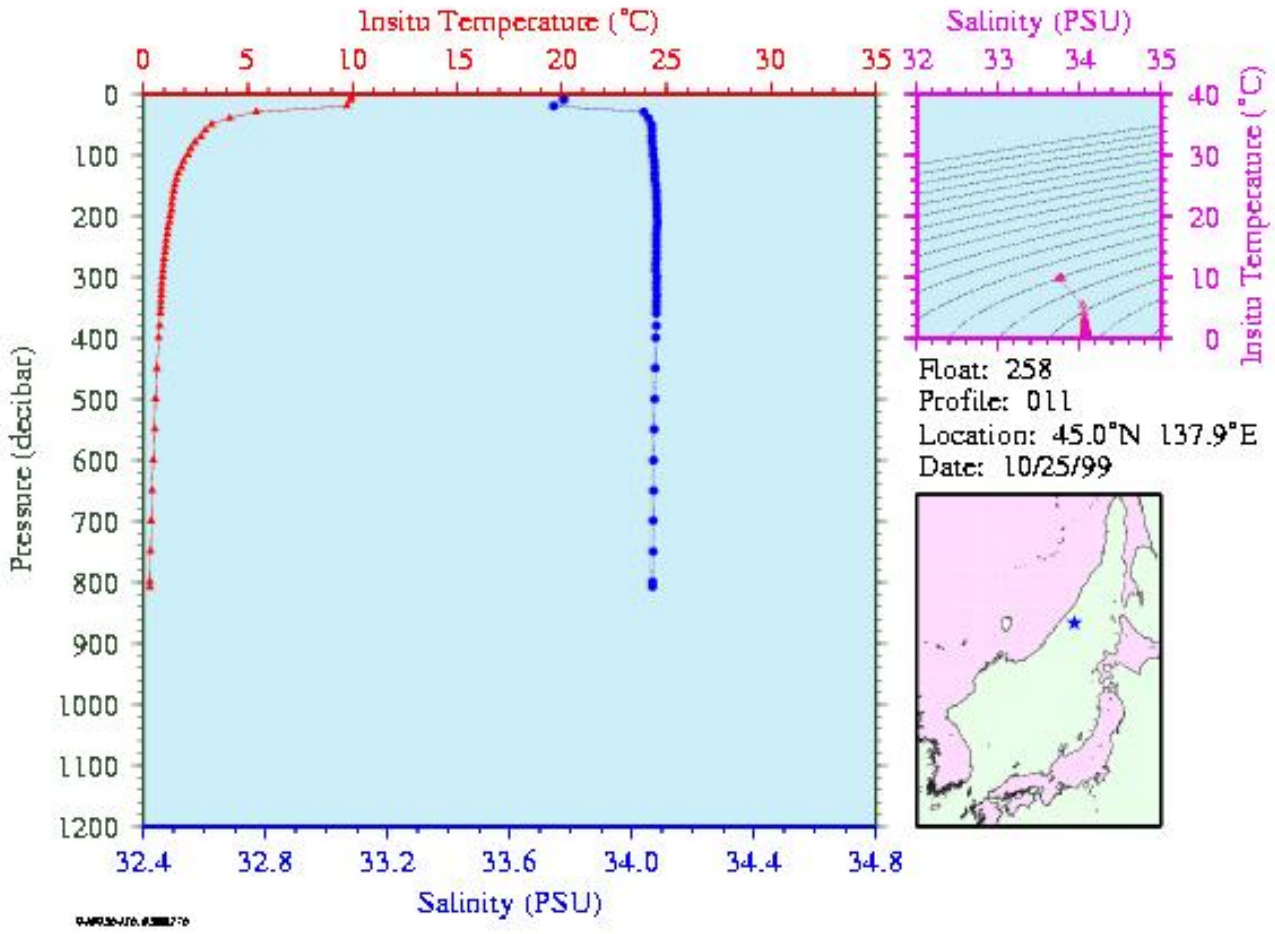
None yet.

RELATED PROJECTS

A number of other investigators are also working on the Japan Sea project. I have worked most closely with Prof. Lynne Talley of Scripps, who was chief scientist on the *Revelle* hydrography/tracer cruise in the Japan Sea in the summer of 1999 and also was in charge of planning the CTD work on the *Khromov* cruise. She is also working closely with the Russians to insure that this work is successful.



This figure shows a composite plot of all UW PALACE floats in the Japan Sea as of 29 October 1999. Most of the floats are drifting at a depth near 800 m.



This figure shows the position and most recent CTD profile from PALACE 258 in the Japan Sea. The float was deployed from the Russian vessel Professor Khromov in August of 1999. The float drifts near a depth of 800 m and collects profiles at approximately 7 day intervals.